



FCC ID: M82-TREK530LTE  
Report No.: T170908D07-A-RP8

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## FCC 47 CFR PART 27 SUBPART L

### TEST REPORT

For

Computer

Model: TREK-530

Trade Name: ADVANTECH

*Issued to*

**Advantech Co.Ltd.**  
**No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114,**  
**Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**  
**Wugong Laboratory**  
**No.11, Wugong 6th Rd., Wugu Dist.,**  
**New Taipei City 24891, Taiwan. (R.O.C.)**  
**<http://www.ccsrf.com>**  
**Issued Date: May 4, 2018**

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
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### Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	May 4, 2018	Initial Issue	ALL	Allison Chen
01	August 15, 2018	1. Revised antenna type. 2. Revised values of transmit power. 3. Revised test summary. 4. Revised description of KDB 971168 no. 5. Revised test data in section 8.1. 6. Revised test procedure in section in 8.2. 7. Added test results in section in 8.6. 8. Revised description of limit in section 8.8 and 8.9.	P.5-7, 12-13, 15-16, 19, 21, 24, 29, 38-40	Allison Chen
02	August 21, 2018	1. Revised test summary.	P.6	Allison Chen
03	August 29, 2018	1. Revised test procedure in section 8.7.	P.29	Allison Chen



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## 1 TEST RESULT CERTIFICATION

**Applicant:** Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,  
Taipei 114, Taiwan, R.O.C.

**Manufacturer:** Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,  
Taipei 114, Taiwan, R.O.C.

**Equipment Under Test:** Computer

**Trade Name:** ADVANTECH

**Model:** TREK-530

**Date of Test:** November 27, 2017 ~ April 19, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 27 SUBPART L	No non-compliance noted

### We hereby certify that:

The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA-603-E and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 27 Subpart L.

The test results of this report relate only to the tested sample identified in this report.

*Approved by:*

*Tested by:*

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Sam Chuang  
Manager  
Compliance Certification Services Inc.

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Kevin Kuo  
Engineer  
Compliance Certification Services Inc.



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## 2 EUT DESCRIPTION

<b>Product</b>	Computer
<b>Model No.</b>	TREK-530
<b>Model Discrepancy</b>	N/A
<b>Trade Name</b>	ADVANTECH
<b>Received Date</b>	September 8, 2017
<b>Power Supply</b>	Powered from host device: DC 12V
<b>Frequency Range</b>	WCDMA Band IV: 1712.4-1752.6 MHz
<b>Transmit Power (EIRP Power)</b>	WCDMA 12.2k RMC Band IV: 24.69dBm
<b>Antenna Gain</b>	Dipole Antenna WCDMA band IV: 0.9dBi

**Remark:** 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.



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### 3 TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
2.1046	8.1	Average Power	Pass
27.50(d)	8.2	EIRP Measurement	Pass
2.1049	8.3	Occupied Bandwidth Measurement	Pass
27.53(h)	8.4	Conducted Band Edge	Pass
27.53(h)	8.5	Conducted Spurious Emission	Pass
27.50(a)	8.6	Peak to Average Ratio	Pass
27.53(h)	8.7	Spurious Radiation Measurement	Pass
2.1055, 27.54	8.8	Frequency Stability v.s. temperature measurement	Pass

## 4 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on TIA-603-E and FCC CFR 47, Part 27 Subpart L, KDB 971168 D01 Power Meas License Digital Systems.

### 4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### 4.2 DESCRIPTION OF TEST MODES

The EUT (model: TREK-530) had been tested under operating condition.

EUT staying in continuous transmitting mode was programmed.

After verification, all tests carried out are with the worst-case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode and receiving radiated spurious emission above 1GHz, which worst case was in CH Mid mode only.

WCDMA Band IV:

Channel Low (CH1312), Channel Mid (CH1413) and Channel High (CH1513) were chosen for full testing.

### 4.3 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
DC Voltage	DC 12V
Test Mode	Mode 1: EUT power by Power Supply.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Position	<input type="checkbox"/> Placed in fixed position. <input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Remark:

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (Z-Plane) were recorded in this report.

## 5 INSTRUMENT CALIBRATION

### 5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 5.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

Wugu fully Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Analyzer	Agilent	E4407B	MY44212686	04/07/2017	04/06/2018
Pre-Amplifier	EMEC	EM01M62G	60570	08/01/2017	07/31/2018
Bilog Antenna	Sunol Sciences	JB1	A052609	03/17/2017	03/16/2018
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/08/2017	03/07/2018
Pre-Amplifier	Anritsu	MH648A	M89145	06/27/2017	06/26/2018
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Filter	N/A	800-1G	N/A	07/20/2017	07/19/2018
Filter	N/A	1800-2000	N/A	07/20/2017	07/19/2018
WWAN signal cable	HUBER SUHNER	SUCOFLEX 104PEA	33960	07/31/2017	07/30/2018
Base Station	R&S	CMU 200	101245	07/29/2017	07/25/2018

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Base Station	R&S	CMU 200	101245	07/29/2017	07/25/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Spectrum Analyzer	Keysight	N9010B	MY55460167	06/14/2017	06/13/2018
Thermostatic/Hrgrosatic Chamber	TAICHY	MHG-150LF	930619	10/11/2017	10/10/2018
Directional Coupler	Agilent	87301D	MY44350252	07/25/2017	07/24/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Divider	Solvang Technology	2-18GHz 4Way	STI08-0015	07/26/2017	07/25/2018





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### 5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
3M Semi Anechoic Chamber / 30M~200M	+/-4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/-3.9483
3M Semi Anechoic Chamber / 1G~8G	+/-2.5975
3M Semi Anechoic Chamber / 8G~18G	+/-2.6112
3M Semi Anechoic Chamber / 18G~26G	+/-2.7389
3M Semi Anechoic Chamber / 26G~40G	+/-2.9683

**Remark:** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

## 6 FACILITIES AND ACCREDITATIONS

### 6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

- ☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
- ☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan, R.O.C

### 6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



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## 7 SETUP OF EQUIPMENT UNDER TEST

### 7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

### 7.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable
1	DC Power Source	GWINSTEK	SPS-3610	N/A	N/A	DC Cable 1.5m shielding
2	NB	ASUS	M5200AE	N/A	PD9WM3B2100	RS232 to USB Cable 1.5m

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



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## 8 FCC PART 27 REQUIREMENTS

### 8.1 AVERAGE POWER

#### LIMIT

For reporting purposes only.

#### Test Procedures

##### CONDUCTED POWER MEASUREMENT:

1. The transmitter output power was connected to the call box.
2. Set EUT at maximum output power via call box.
3. Set Call box at lowest, middle and highest channels for each band and modulation.

#### Test results

No non-compliance noted.

### TEST DATA

#### WCDMA 12.2K RMC

Band	Data Rate or Sub-test	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
WCDMA Band IV	RMC 12.2Kbps	1312/1537	1712.4	22.8	0.19055
		1413/1638	1732.6	22.8	0.19055
		1513/1738	1752.6	22.9	0.19498

**HSDPA**

Band	Data Rate or Sub-test	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSDPA IV	1	1312/1537	1712.4	22.8	0.19055
		1413/1638	1732.6	22.8	0.19055
		1513/1738	1752.6	22.9	0.19498
	2	1312/1537	1712.4	22.3	0.16982
		1413/1638	1732.6	22.3	0.16982
		1513/1738	1752.6	22.4	0.17378
	3	1312/1537	1712.4	21.7	0.14791
		1413/1638	1732.6	21.7	0.14791
		1513/1738	1752.6	21.8	0.15136
	4	1312/1537	1712.4	21.7	0.14791
		1413/1638	1732.6	21.7	0.14791
		1513/1738	1752.6	21.8	0.15136

**HSUPA**

Band	Data Rate or Sub-test	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSUPA IV	1	1312/1537	1712.4	22.7	0.18621
		1413/1638	1732.6	22.8	0.19055
		1513/1738	1752.6	22.9	0.19498
	2	1312/1537	1712.4	20.7	0.11749
		1413/1638	1732.6	20.8	0.12023
		1513/1738	1752.6	20.9	0.12303
	3	1312/1537	1712.4	21.7	0.14791
		1413/1638	1732.6	21.8	0.15136
		1513/1738	1752.6	21.9	0.15488
	4	1312/1537	1712.4	20.7	0.11749
		1413/1638	1732.6	20.8	0.12023
		1513/1738	1752.6	20.9	0.12303
	5	1312/1537	1712.4	22.7	0.18621
		1413/1638	1732.6	22.8	0.19055
		1513/1738	1752.6	22.9	0.19498

## 8.2 EIRP MEASUREMENT

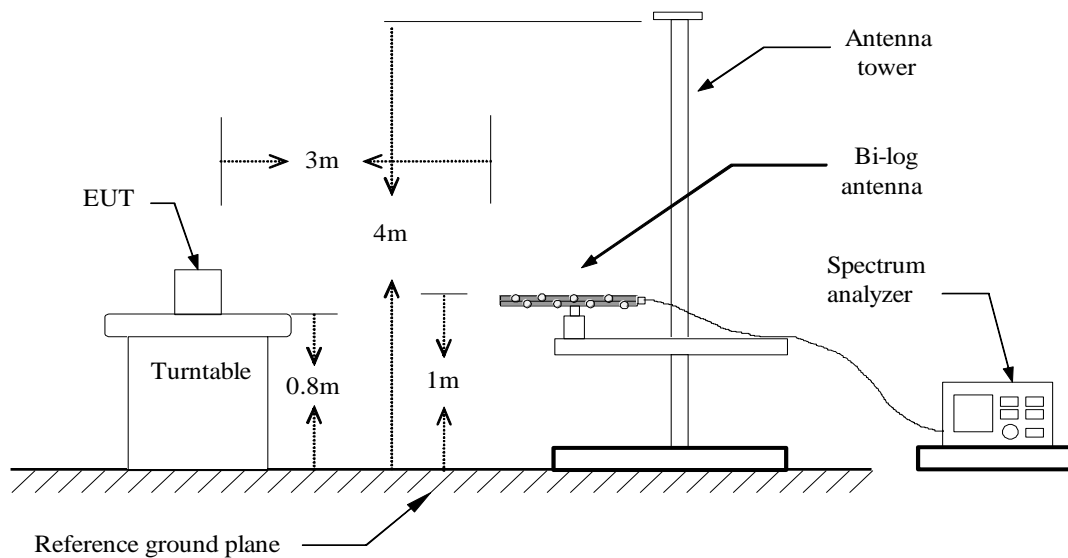
### LIMIT

#### FCC Part 27.50(d)(4)

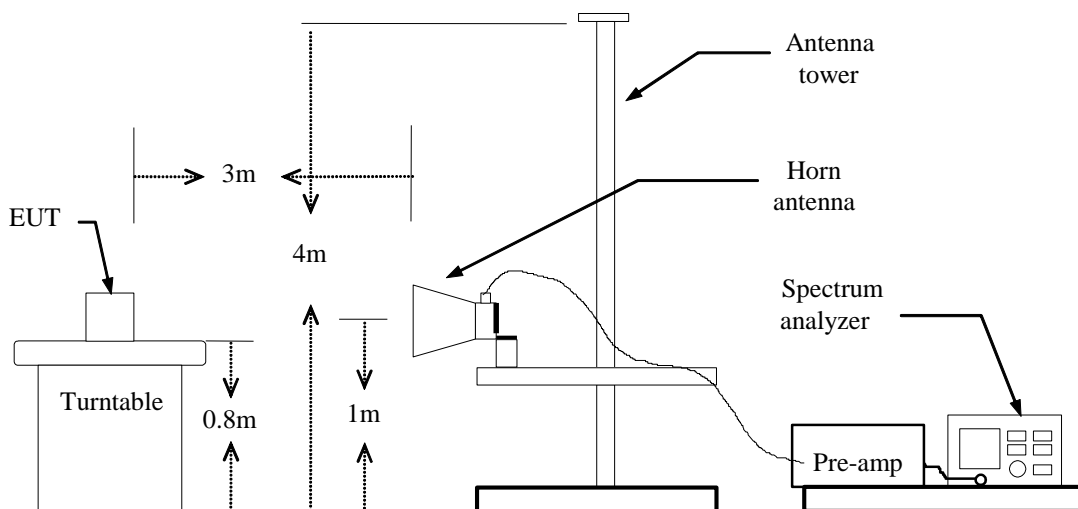
Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

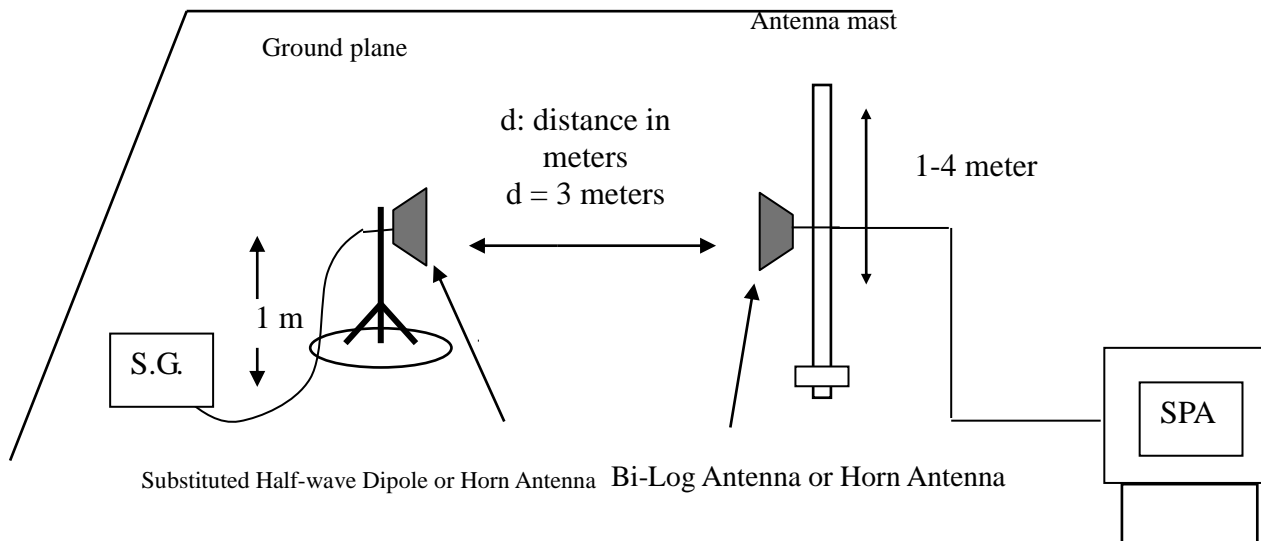
### Test Configuration

#### Below 1 GHz



#### Above 1 GHz



**For Substituted Method Test Set-UP****TEST PROCEDURE**

1. The EUT was placed on a non-conductive rotating platform (0.8m for below 1G and above 1G) in a semi-chamber. The radiated emission at the fundamental frequency was measured at 3m and SA with RMS detector per section 5, KDB 971168 D01 Power Meas License Digital Systems.

2. During the measurement, the call box parameters were set to get the maximum output power of the EUT. The maximum emission was recorded from spectrum analyzer power level (LVL) from 360 degrees rotation of turntable and the test antenna raised and lowered over a range from 1m to 4m in both horizontally and vertically polarized orientations.

3. EIRP was measured method according to TIA/EIA-603-E. The EUT was replaced by the substitution antenna at same location, and then record the maximum Analyzer reading through raised and lowered the test antenna.

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

**TEST RESULTS**

*No non-compliance noted.*

**TEST DATA****WCDMA 12.2K RMC**

Test Mode	Channel	Vertical		Horizontal	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
WCDMA 12.2K RMC (Band IV)	Lowest	23.36	0.216	24.69	0.294
	Middle	22.82	0.191	24.64	0.291
	Highest	22.68	0.185	24.35	0.272



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## 8.3 OCCUPIED BANDWIDTH MEASUREMENT

### LIMIT

For Reporting purpose only.

### TEST PROCEDURE

KDB 971168 D01 Power Meas License Digital Systems.

1. The occupied bandwidth was measured with the spectrum analyzer at the lowest, middle and highest channels in each band and different modulation. The 99% and -26dB bandwidth was measured and recorded.
2. RBW = 1-5% of the expected OBW
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. *Trace mode = max. hold*

### TEST RESULTS

No non-compliance noted

#### Test Data

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA 12.2k RMC (Band IV)	Lowest	1712.4	4.1534	4.6600
	Middle	1732.6	4.1534	4.6600
	Highest	1752.6	4.1678	4.674

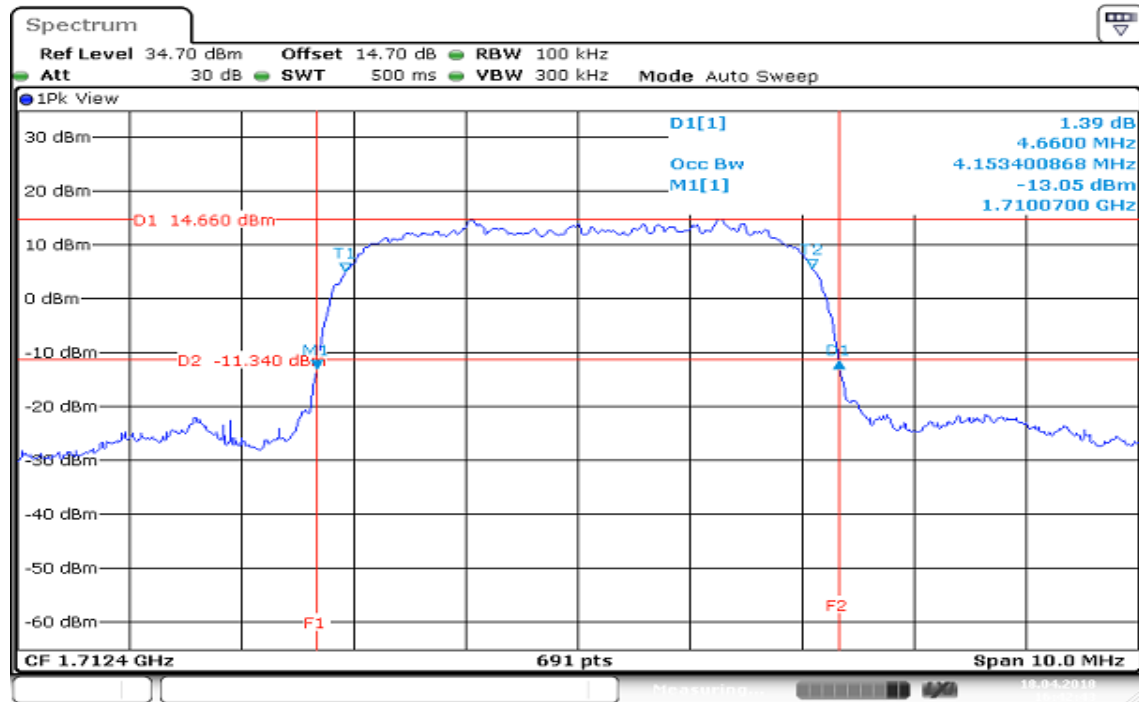


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## Test Plot

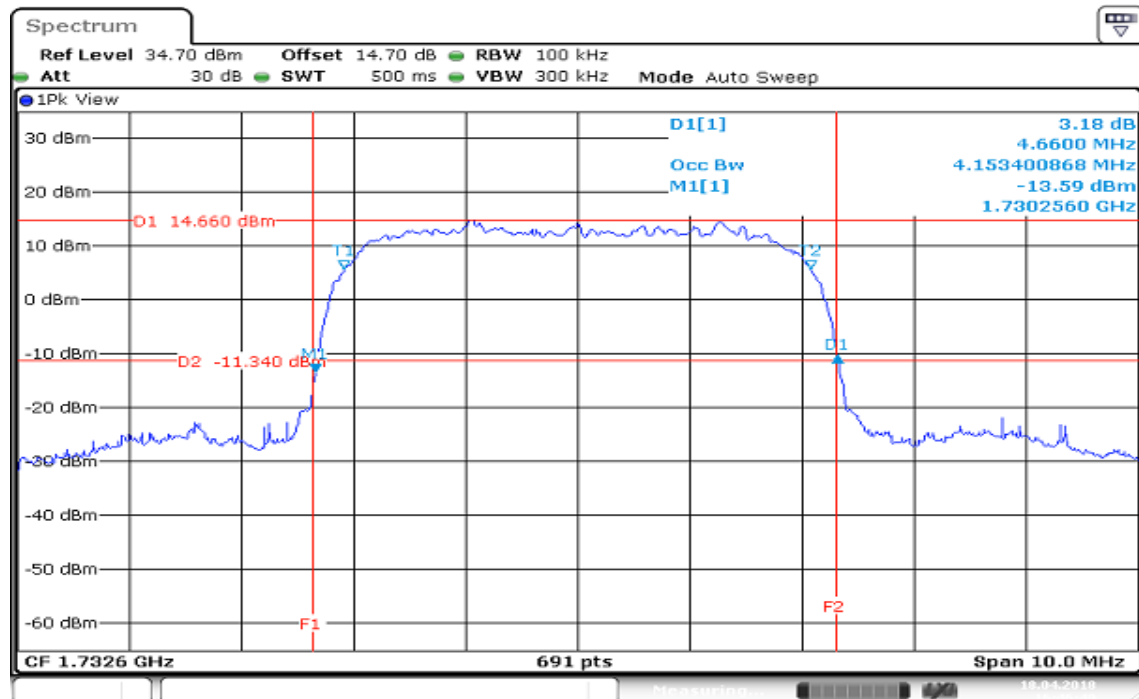
## WCDMA 12.2k RMC (Band IV)

## Low CH



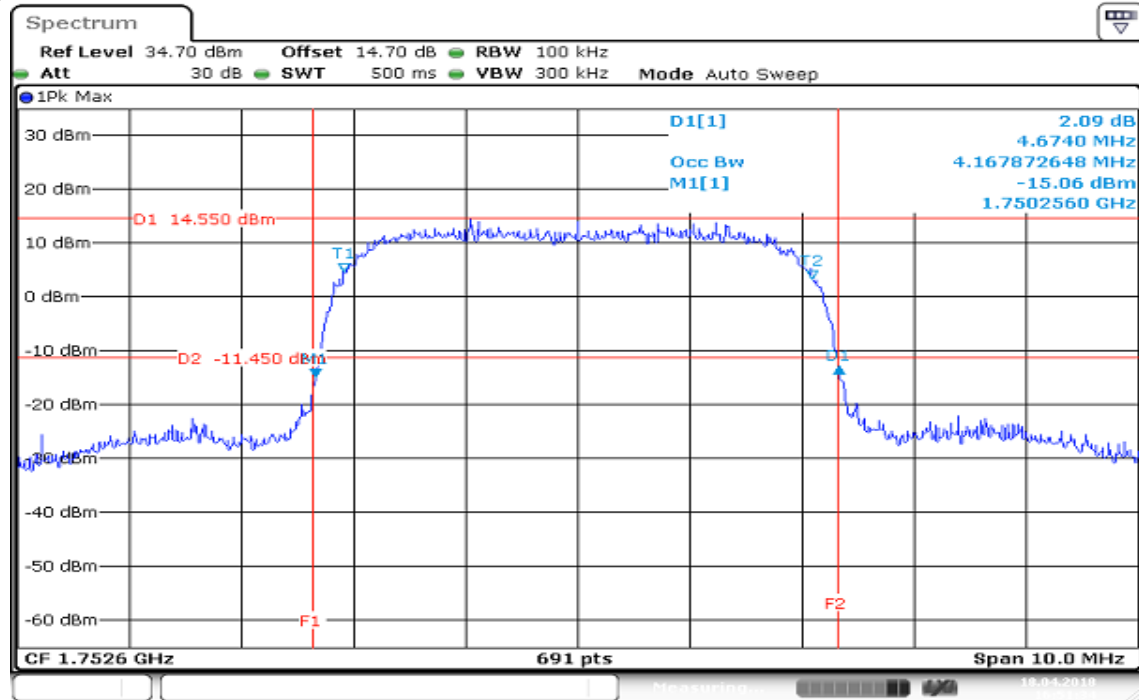
Date: 18 APR 2018 16:42:43

## Mid CH



Date: 18 APR 2018 16:46:49

## High CH



Date: 18 APR 2018 16:51:24

## 8.4 CONDUCTED BAND EDGE MEASUREMENT

### Limit

#### FCC §27.53 (h)

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### TEST PROCEDURE

According to KDB 971168 D01 Power Meas License Digital Systems, section 6.0

1. The EUT was connected to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Start and stop frequency were set such that the band edge would be placed in the center of the plot
4. Span was set large enough so as to capture all out of band emissions near the band edge
5. Set the spectrum analyzer, RBW=100kHz, VBW=300kHz.
6. Record the Band edge emission.

### TEST RESULTS

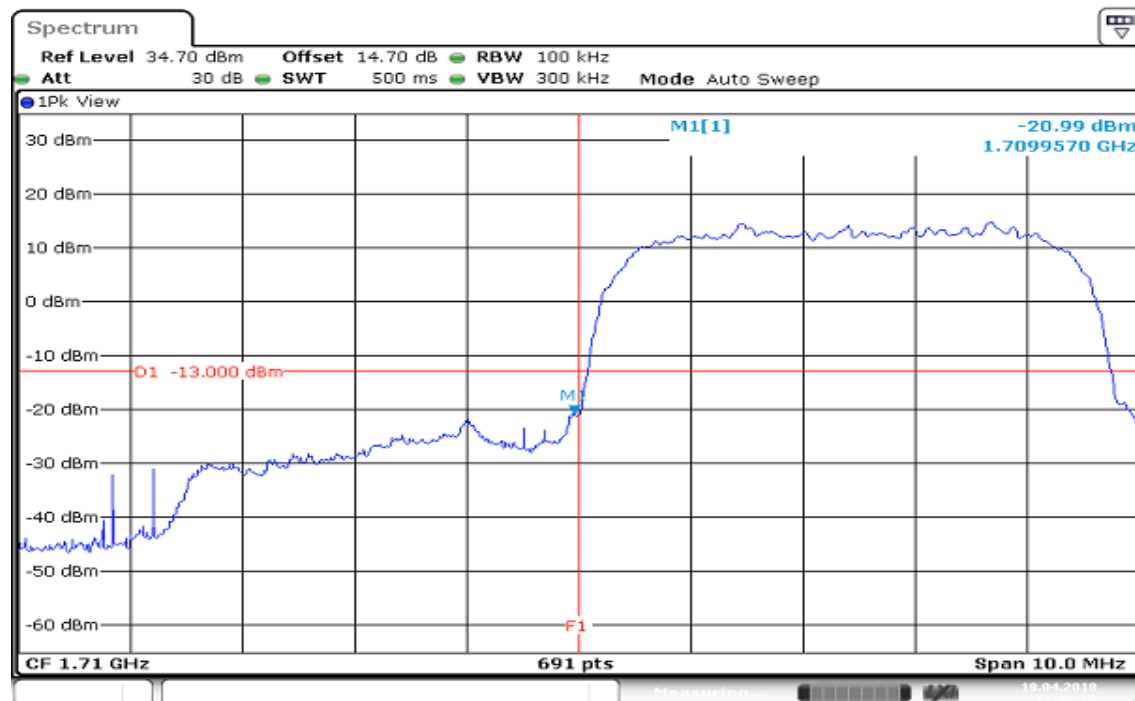
*No non-compliance noted.*

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## Test Plot

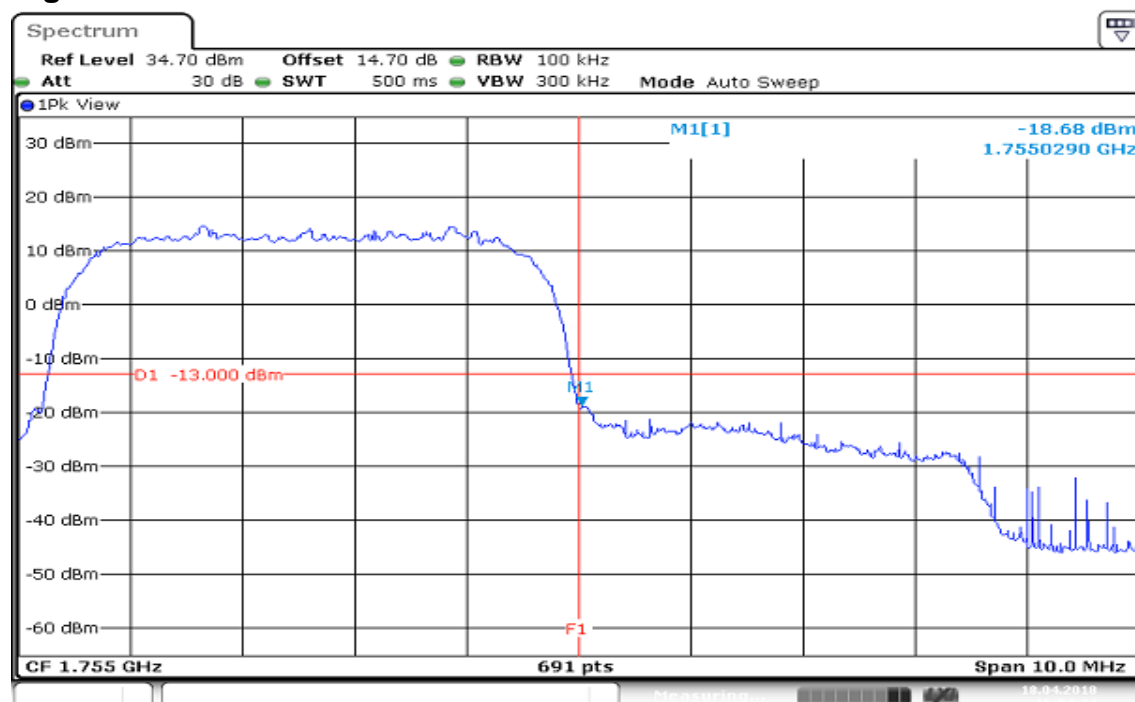
## WCDMA 12.2K RMC (BAND IV)

## CH Low



Date: 18 APR 2018 17:06:26

## CH High



Date: 18 APR 2018 16:54:24

## 8.5 CONDUCTED SPURIOUS EMISSIONS

### LIMIT

#### FCC §27.53 (h)

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### TEST PROCEDURE

According to KDB 971168 D01 Power Meas License Digital Systems, section 6.0

1. The EUT was connected to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Set the spectrum analyzer, RBW=1MHz, VBW=3MHz.
4. Record the maximum spurious emission.
5. The fundamental frequency should be excluded against the limit in operating band.

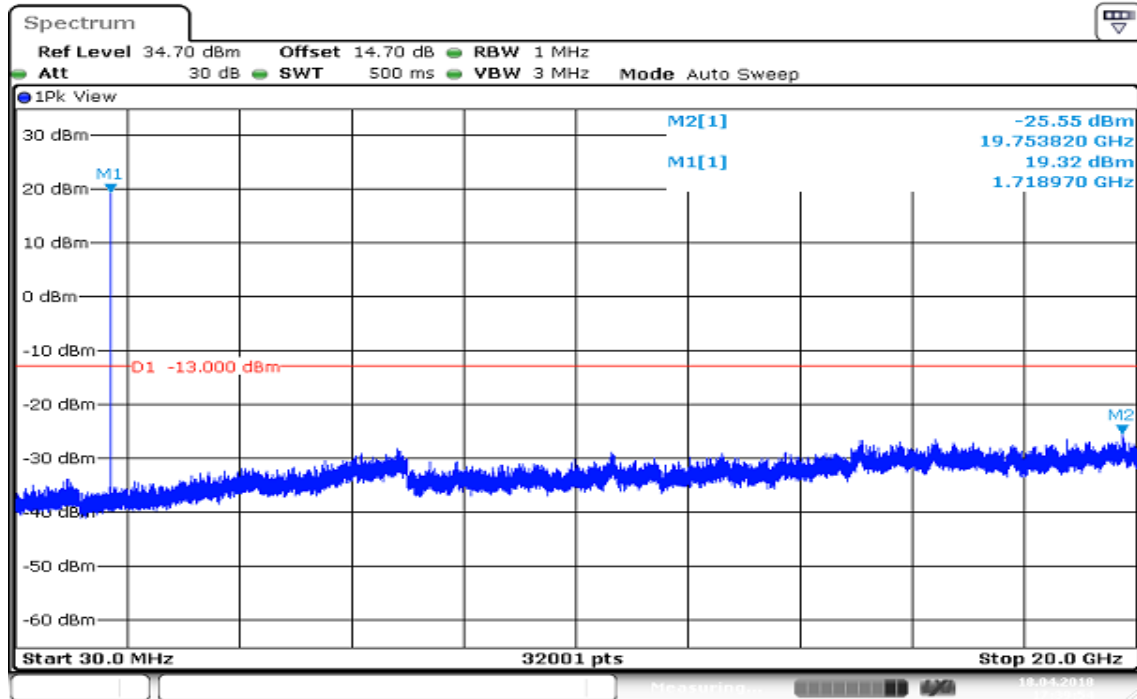
### TEST RESULTS

*No non-compliance noted.*

## Test Data

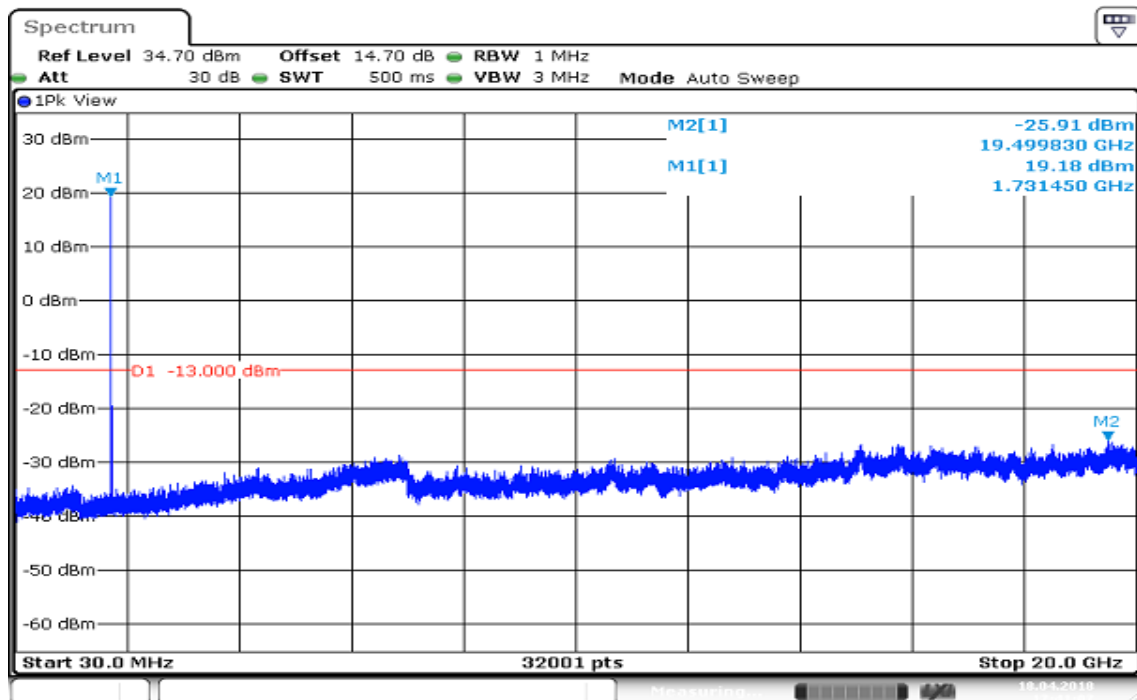
### WCDMA 12.2K RMC (BAND IV)

#### CH Low



Date: 18 APR 2018 17:39:55

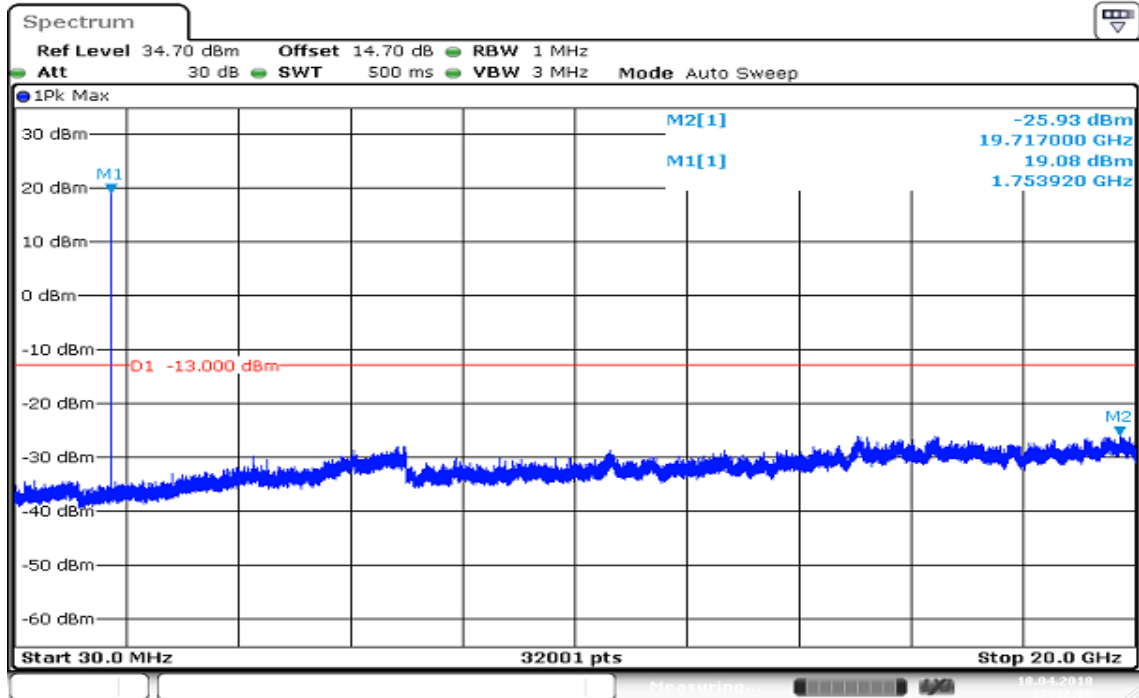
#### CH Mid



Date: 18 APR 2018 17:41:08

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## CH High



Date: 18 APR 2018 17:42:08

## 8.6 PEAK TO AVERAGE POWER RATIO

### Limit

#### **FCC §27.50(a)**

In measuring transmissions in this band using an average power technique, peak-to-average power ratio (PAPR) of the transmission may not exceed 13 dB.

### Test Procedures

1. According to KDB 971168 D01 Power Meas License Digital Systems, photograph 5.7.1
2. The EUT was connect to spectrum analyzer and call box.
3. Set the CCDF function in spectrum analyzer.
4. The highest RF output power were measured and recorded the maximum PAPR level associated with a probability of 0.1%.
5. Record the Peak to Average Power Ratio.

### Test Results

#### **WCDMA 12.2K RMC (BAND IV)**

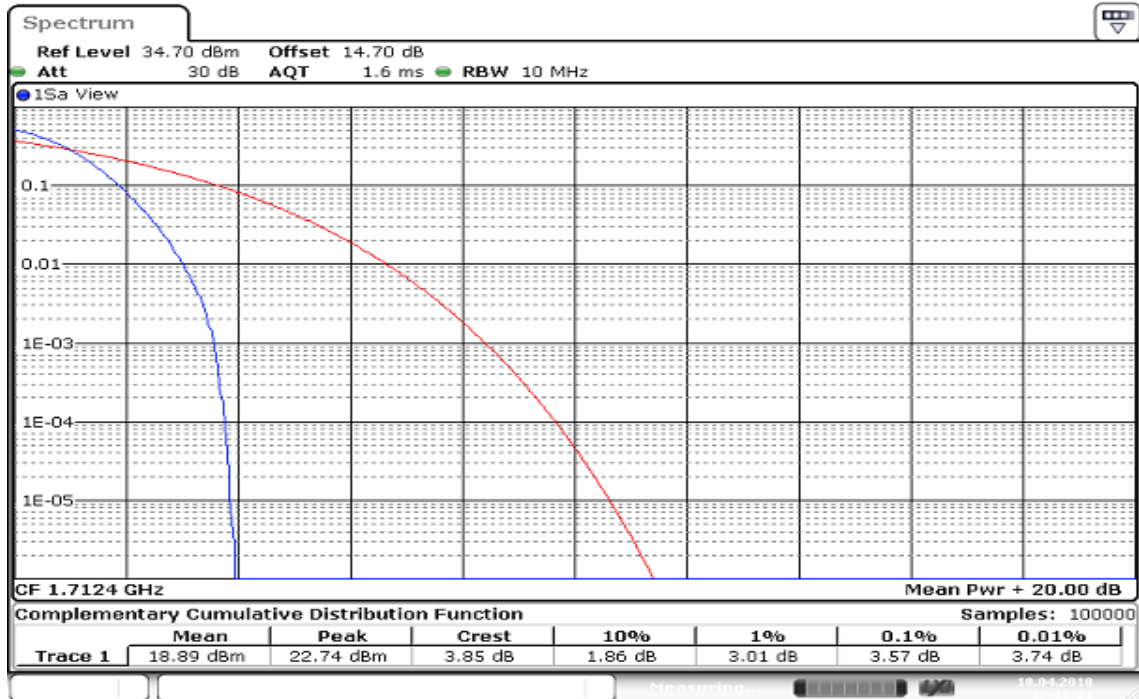
	<b>Mean</b>	<b>Peak</b>	<b>Crest</b>	<b>10%</b>	<b>1%</b>	<b>0.1%</b>	<b>0.01%</b>
	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)	(dB)
<b>CH Low</b>	18.89	22.74	3.85	1.86	3.01	3.57	3.74
<b>CH Mid</b>	19.02	22.88	3.86	1.80	2.96	3.54	3.74
<b>CH High</b>	18.87	22.88	4.01	1.83	3.01	3.62	3.88



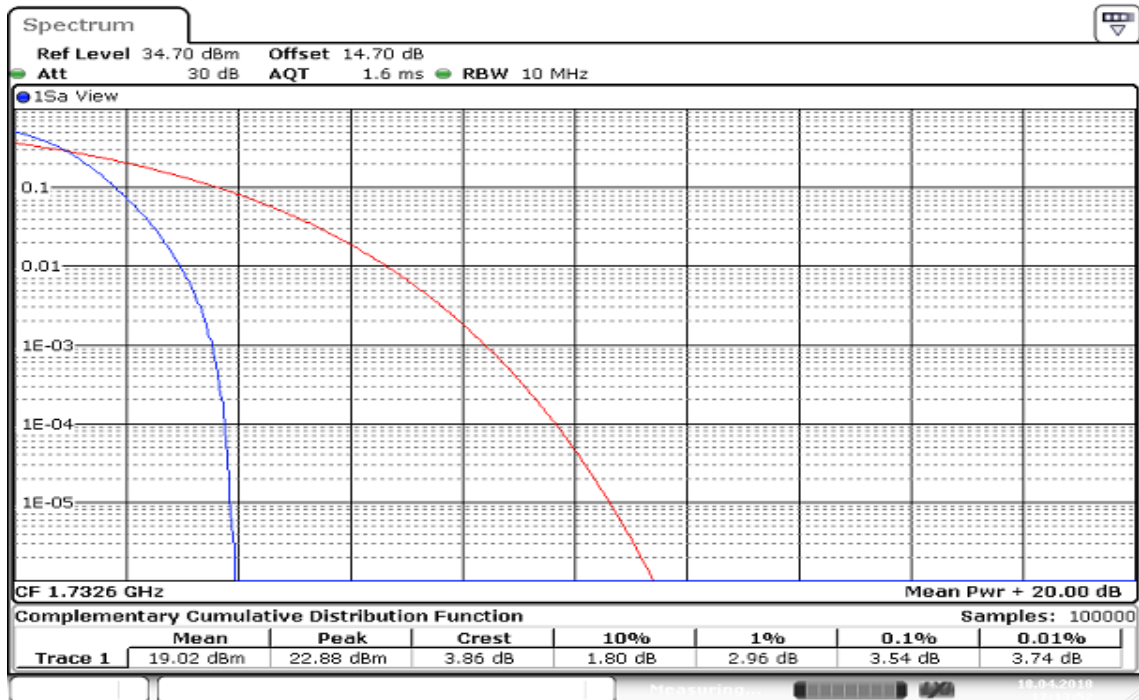
## Test Data

### WCDMA 12.2K RMC (BAND IV)

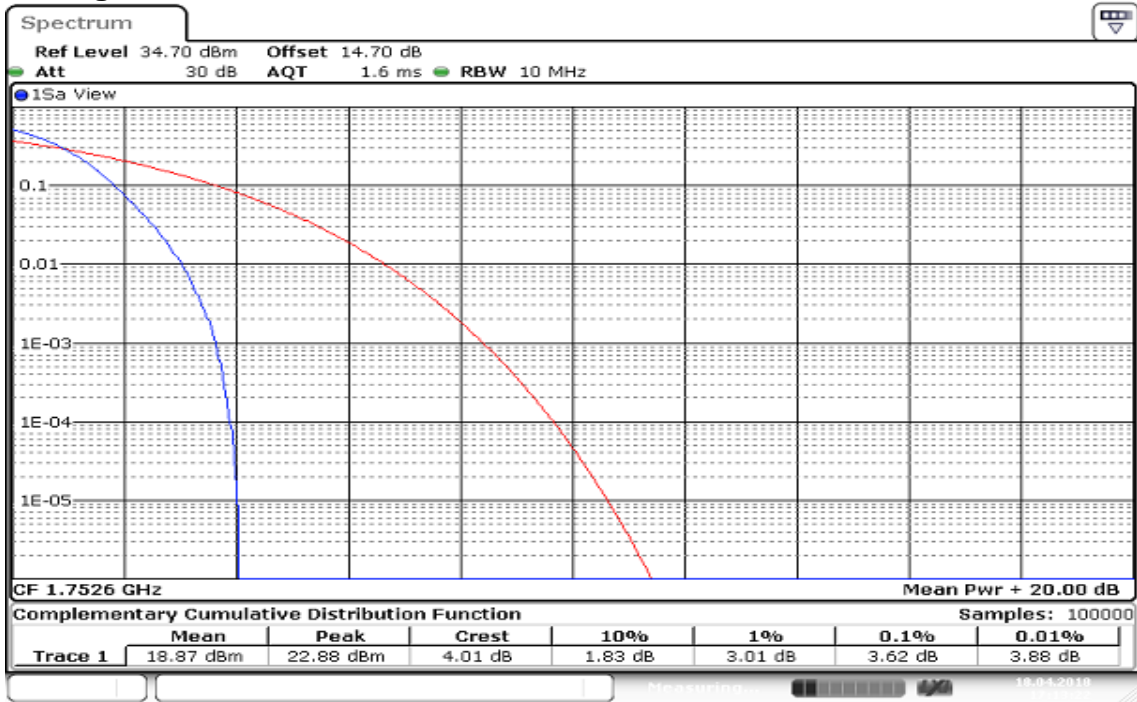
#### CH Low



#### CH Mid



## CH High



Date: 18 APR 2018 17:13:23

## 8.7 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

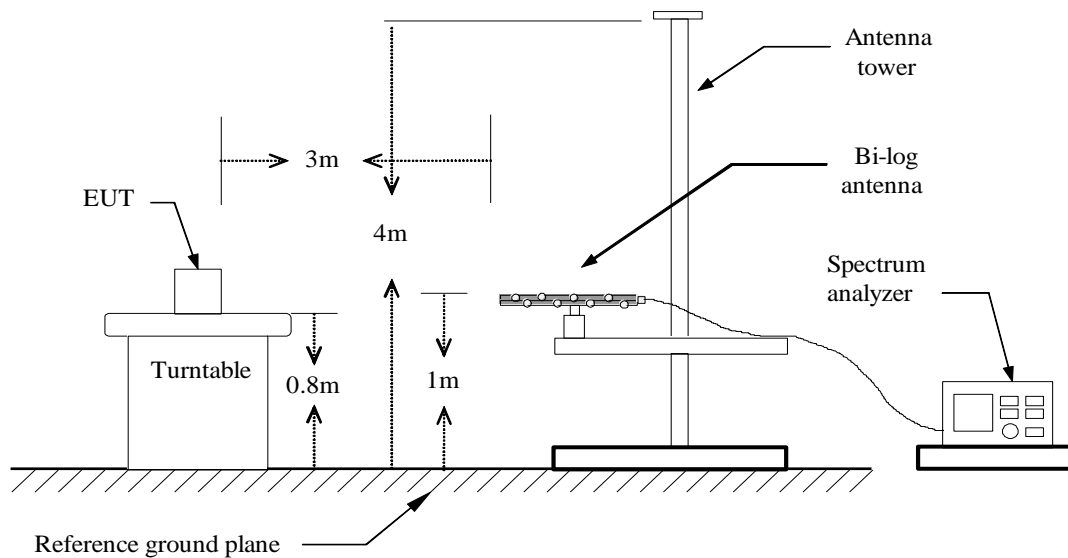
### LIMIT

#### FCC §27.53 (h)

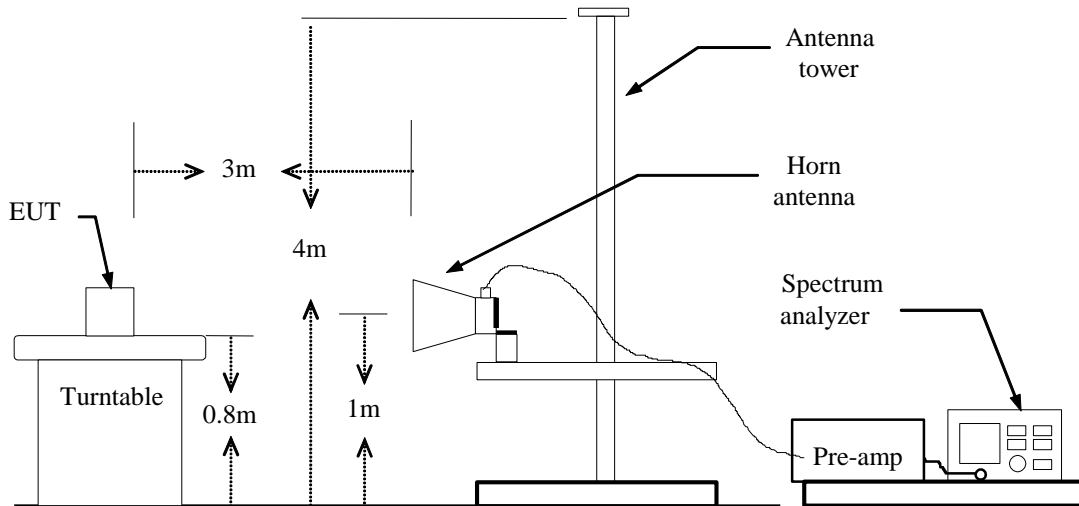
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### Test Configuration

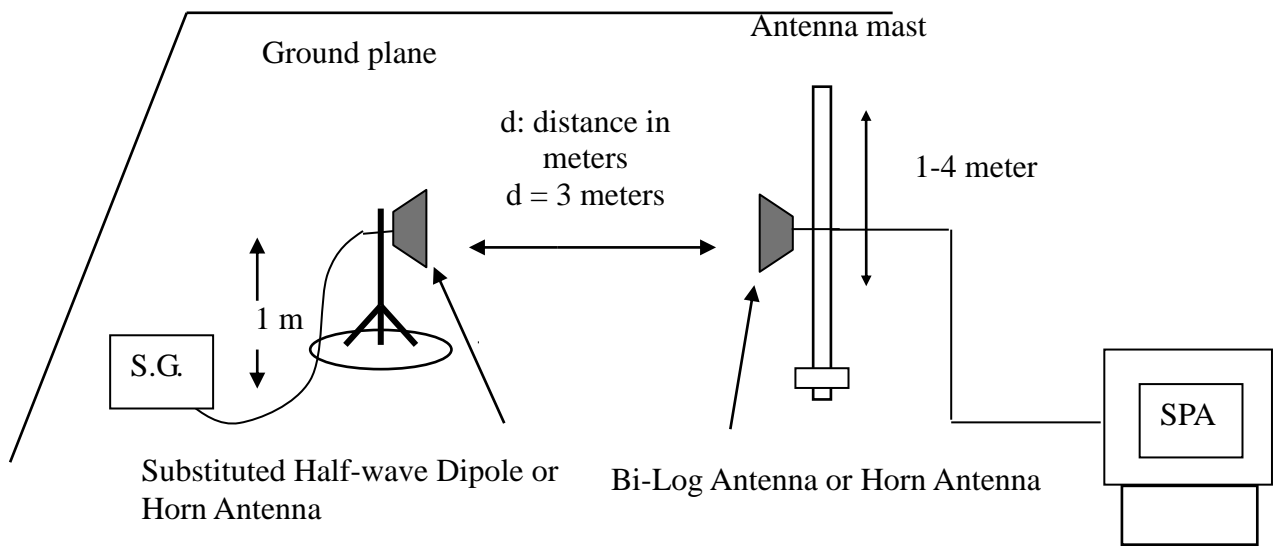
#### Below 1 GHz



## Above 1 GHz



## Substituted Method Test Set-up



**TEST PROCEDURE**

1. According to KDB 971168 D01 Power Meas License Digital Systems section 5.8 and TIA-603-E section 2.2.12.
2. The EUT was placed on a turntable
  - (1) Below 1G : 0.8m
  - (2) Above 1G : 1.5m
  - (3) EUT set 3m from the receiving antenna
  - (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission

ERP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB) - 2.15

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

For test result, the S.G. value is including antenna gain and cable loss.

Limit Line: -13dBm

**TEST RESULTS**

*Refer to the attached tabular data sheets.*

## Below 1GHz

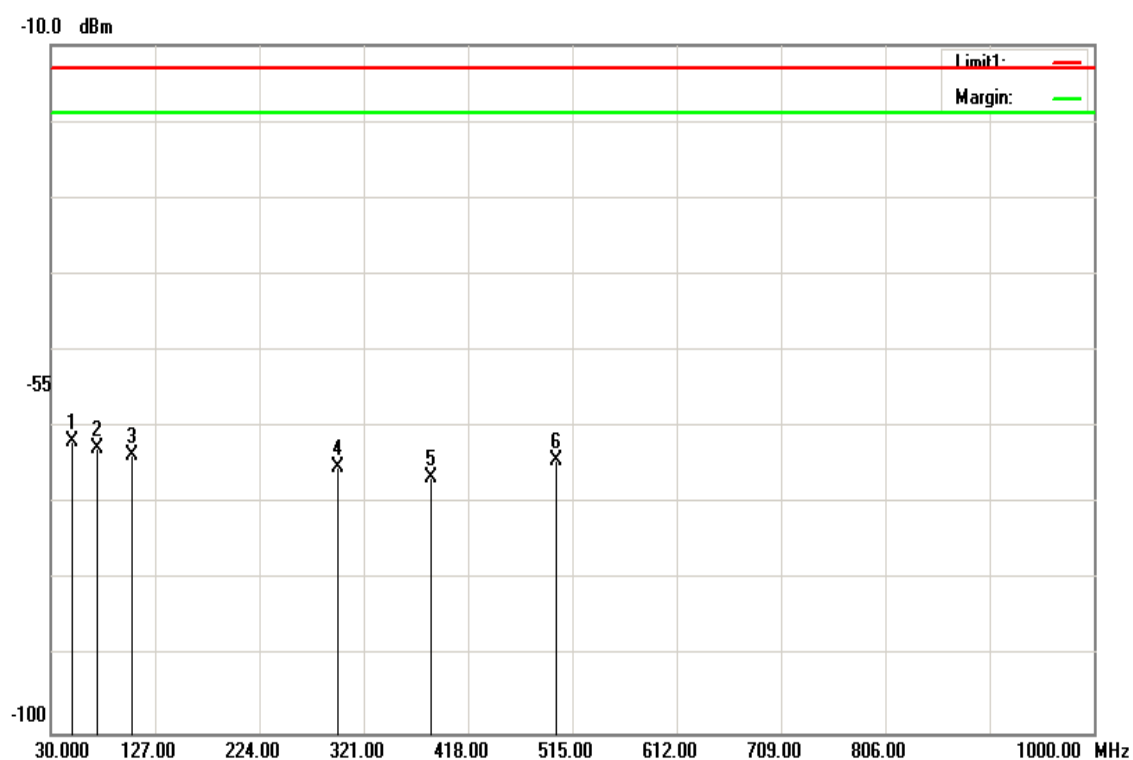
**Operation Mode:** WCDMA 12.2k RMC Band IV / TX /Mid CH

**Test Date:** November 27, 2017

**Temperature:** 21 °C

**Tested by:** Kevin Kuo

**Humidity:** 54 % RH

**Polarity:** Ver.


Frequency (MHz)	S.G. (dBm)	Ant. Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
49.4000	-59.32	-2.56	-61.88	-13.00	-48.88	V
73.6500	-63.42	0.63	-62.79	-13.00	-49.79	V
105.1750	-63.94	0.31	-63.63	-13.00	-50.63	V
296.7500	-72.23	6.93	-65.30	-13.00	-52.30	V
384.0500	-73.9	7.24	-66.66	-13.00	-53.66	V
500.4500	-71.08	6.8	-64.28	-13.00	-51.28	V



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Operation Mode: WCDMA 12.2k RMC Band IV / TX /Mid CH

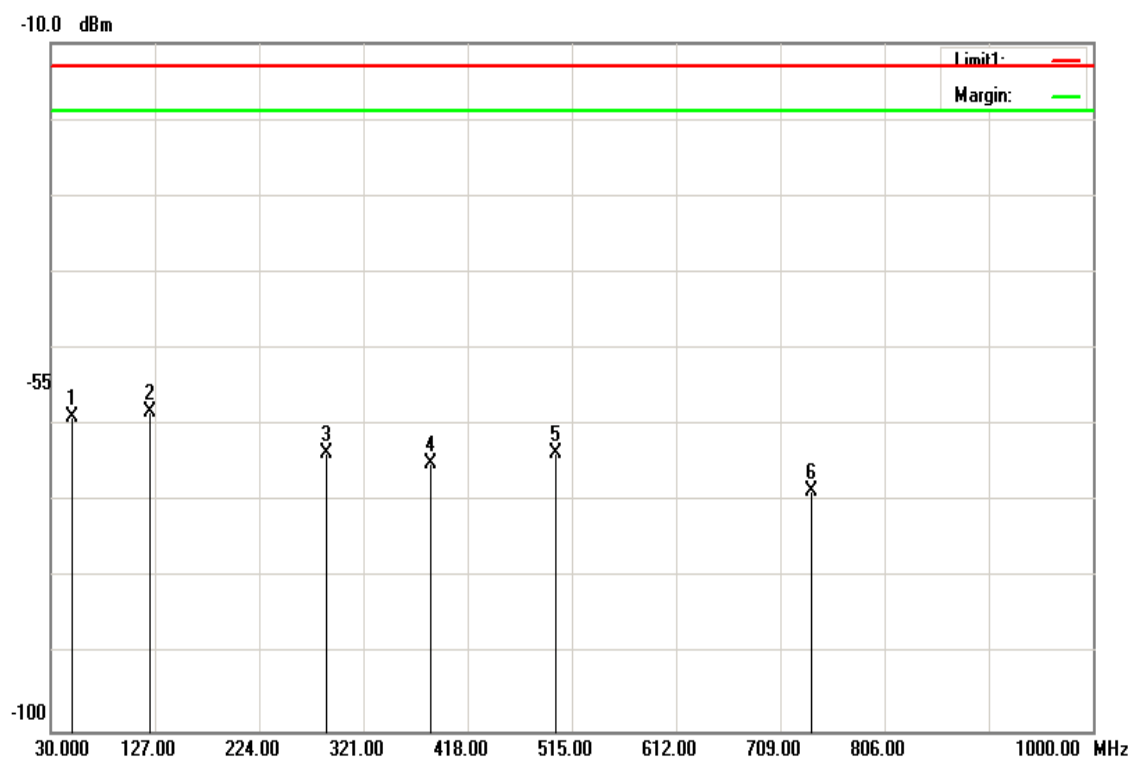
Test Date: November 27, 2017

Temperature: 21 °C

Tested by: Kevin Kuo

Humidity: 54 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
49.4000	-56.44	-2.56	-59.00	-13.00	-46.00	H
122.1500	-59.25	0.93	-58.32	-13.00	-45.32	H
287.0500	-70.8	7.03	-63.77	-13.00	-50.77	H
384.0500	-72.17	7.24	-64.93	-13.00	-51.93	H
500.4500	-70.55	6.8	-63.75	-13.00	-50.75	H
738.1000	-70.36	1.76	-68.60	-13.00	-55.60	H

### Above 1GHz

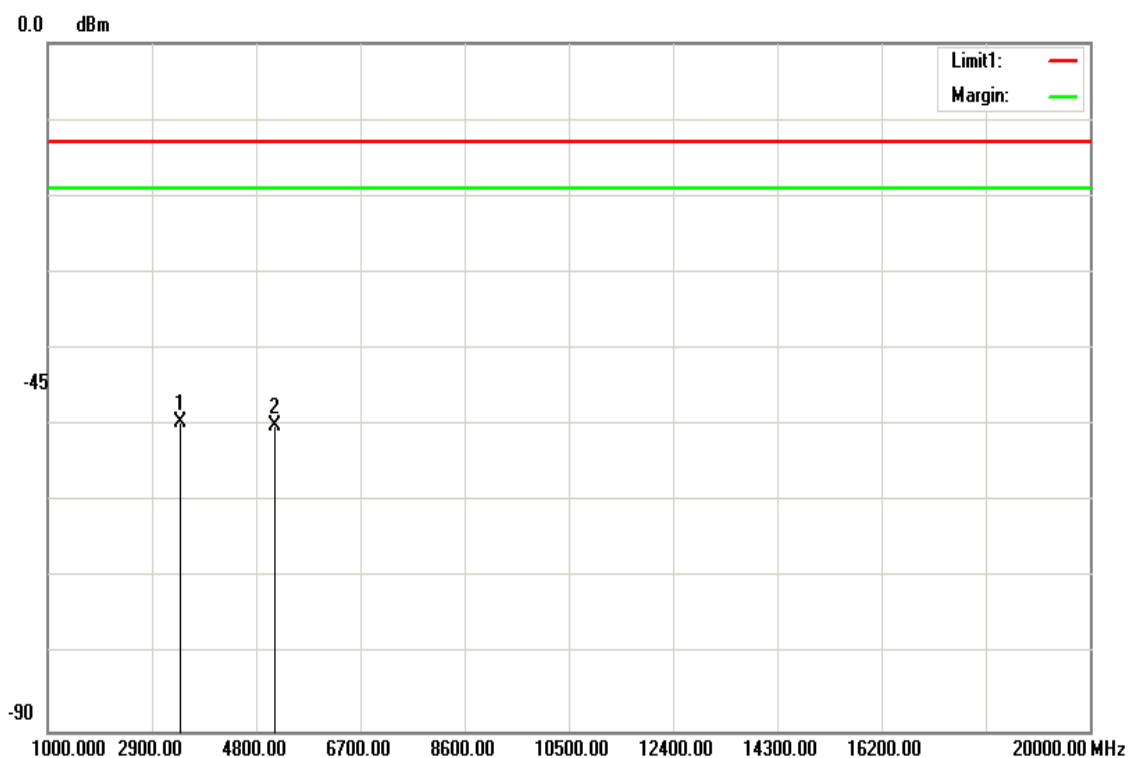
**Operation Mode:** WCDMA 12.2k RMC Band IV / TX /Low CH **Test Date:** November 27, 2017

**Temperature:** 21°C

**Tested by:** Kevin Kuo

**Humidity:** 54 % RH

**Polarity:** Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-61.82	12.3	-49.52	-13.00	-36.52	V
5137.000	-62.75	12.61	-50.14	-13.00	-37.14	V
N/A						

### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.





Report No.: T170908D07-A-RP8

Operation Mode: WCDMA 12.2k RMC Band IV / TX /Low CH

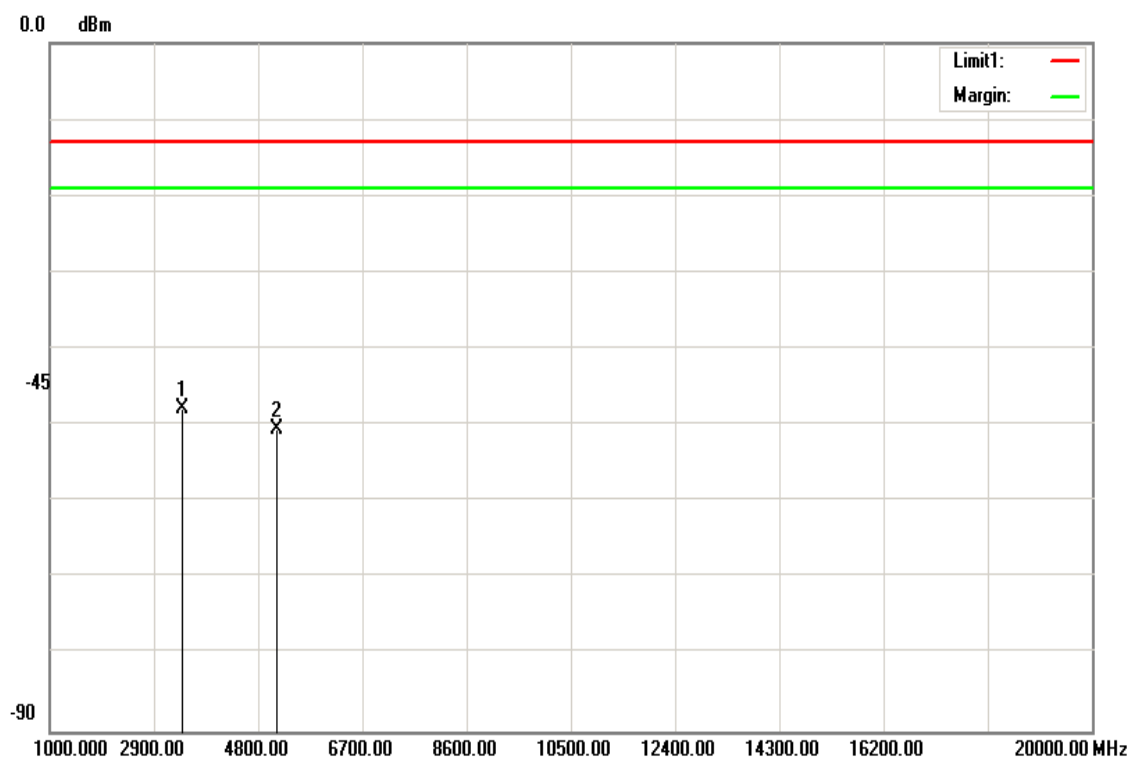
Test Date: November 27, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 54 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-60.13	12.3	-47.83	-13.00	-34.83	H
5137.000	-63.16	12.61	-50.55	-13.00	-37.55	H
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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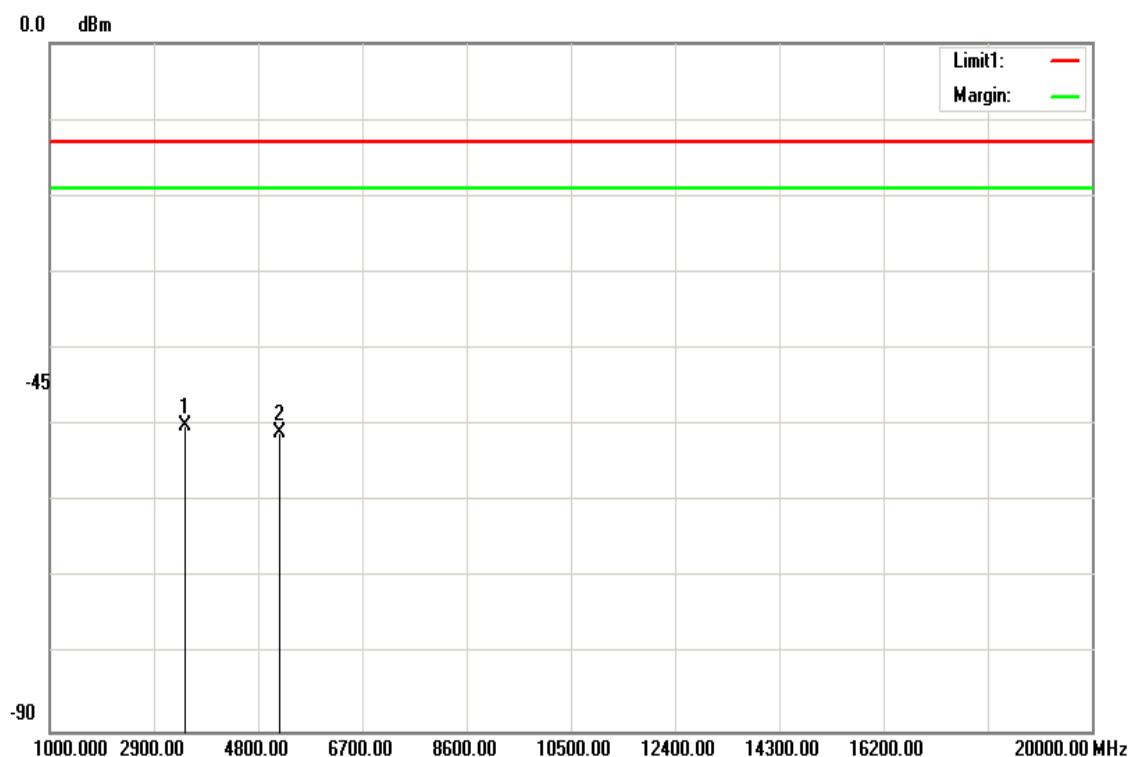
Operation Mode: WCDMA 12.2k RMC Band IV / TX/Mid CH Test Date: November 27, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 54 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3464.000	-62.53	12.41	-50.12	-13.00	-37.12	V
5197.000	-63.52	12.66	-50.86	-13.00	-37.86	V
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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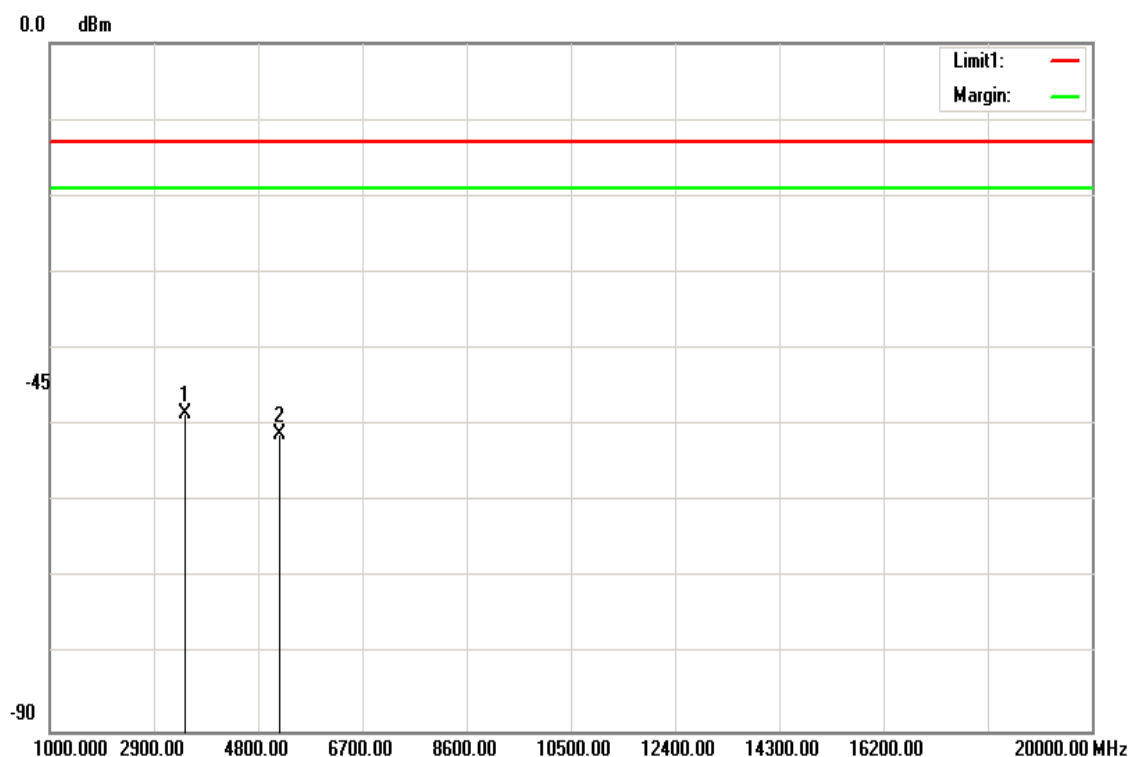
Operation Mode: WCDMA 12.2k RMC Band IV / TX/Mid CH Test Date: November 27, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 54 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3464.000	-60.81	12.41	-48.40	-13.00	-35.40	H
5197.000	-63.85	12.66	-51.19	-13.00	-38.19	H
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Report No.: T170908D07-A-RP8

Operation Mode: WCDMA 12.2k RMC Band IV / TX /High CH

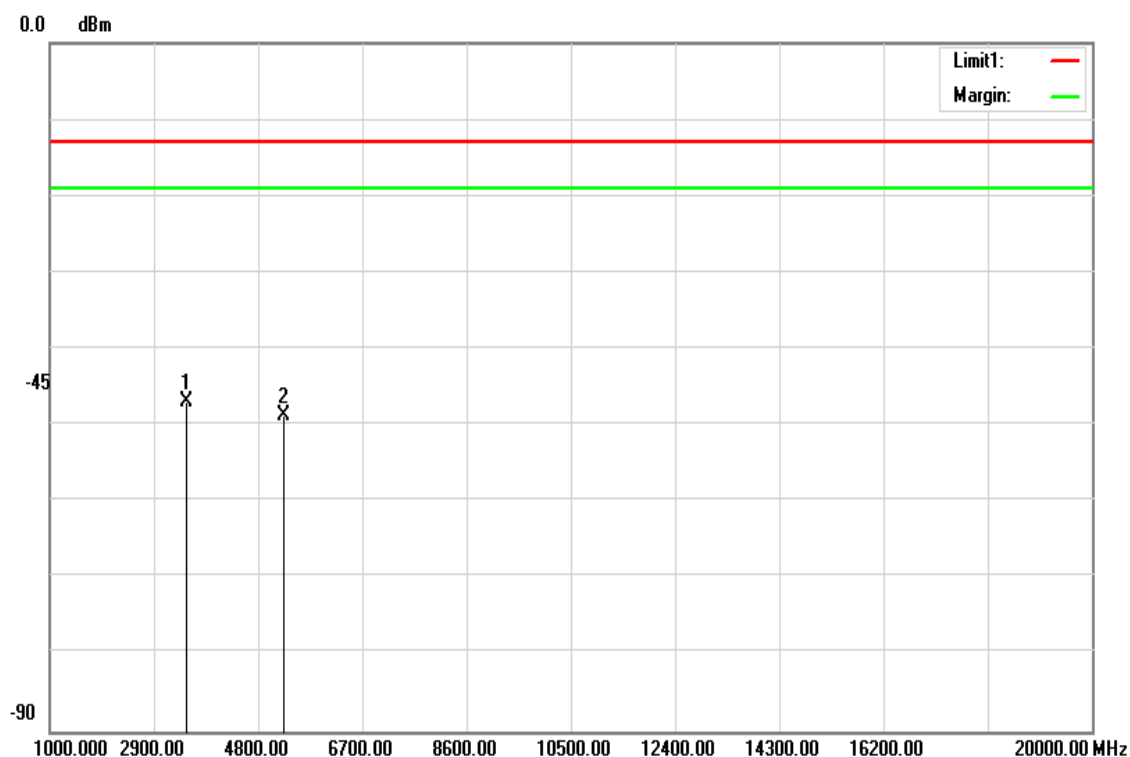
Test Date: November 27, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 54 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-59.43	12.5	-46.93	-13.00	-33.93	V
5256.000	-61.32	12.7	-48.62	-13.00	-35.62	V
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Report No.: T170908D07-A-RP8

Operation Mode: WCDMA 12.2k RMC Band IV / TX /High CH

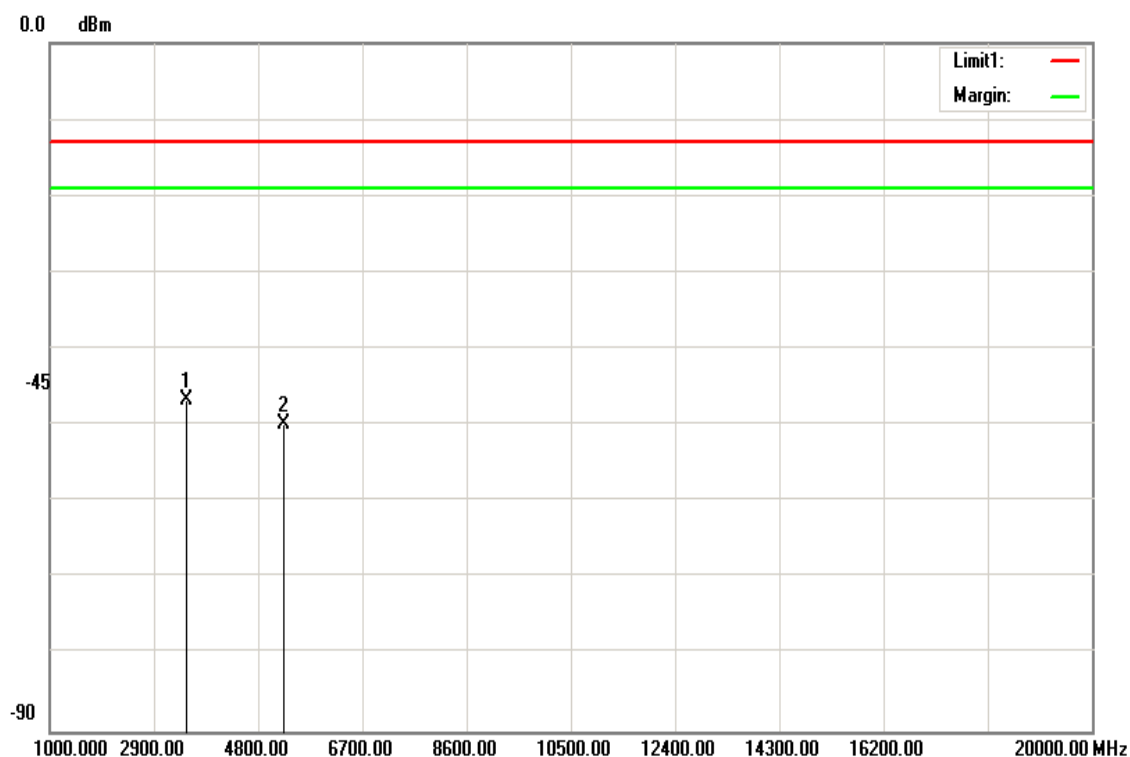
Test Date: November 27, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 54 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-59.08	12.5	-46.58	-13.00	-33.58	H
5256.000	-62.46	12.7	-49.76	-13.00	-36.76	H
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

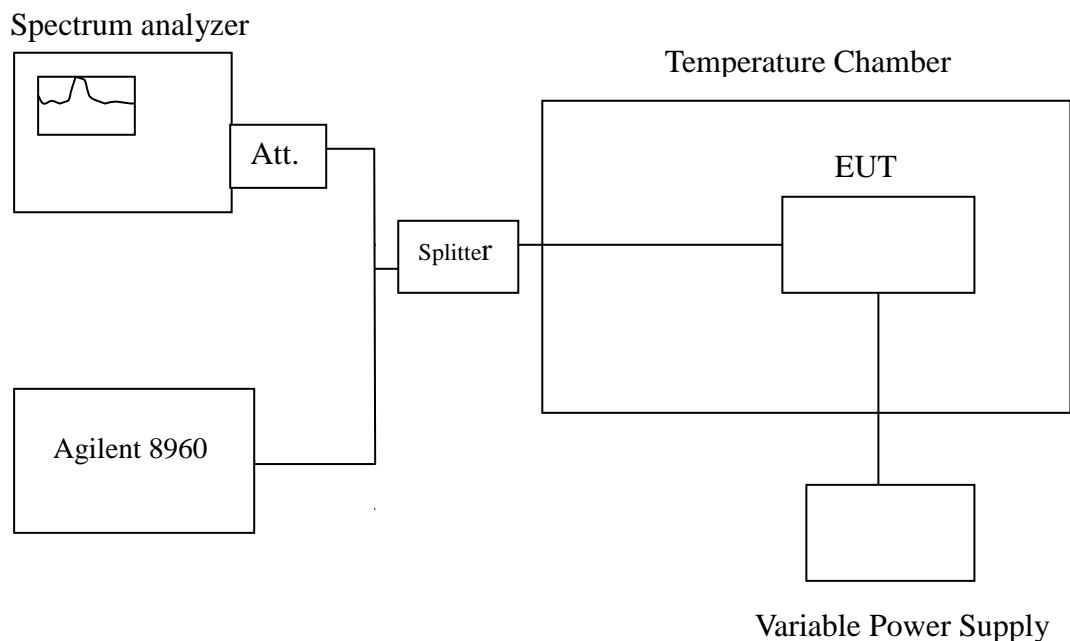
## 8.8 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### LIMIT

According to FCC §2.1055, FCC §22.355, FCC §24.235.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### Test Configuration



**Remark:** Measurement setup for testing on Antenna connector

### TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.



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## **TEST RESULTS**

*No non-compliance noted.*

Reference Frequency: WCDMA 12.2k RMC Band IV Low Channel 1712.4 MHz		
Limit: 1712.4-1752.6 MHz		
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Error(Hz)
12	50	3.00
12	40	2.00
12	30	4.00
12	20	6.00
12	10	2.00
12	0	8.00
12	-10	6.00
12	-20	5.00

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz		
Limit: 1712.4-1752.6 MHz		
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Error(Hz)
12	50	4.00
12	40	4.00
12	30	5.00
12	20	5.00
12	10	4.00
12	0	2.00
12	-10	1.00
12	-20	5.00



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Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz		
Limit: 1712.4-1752.6 MHz		
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Error(Hz)
12	50	-16.00
12	40	-10.00
12	30	-12.00
12	20	-13.00
12	10	-12.00
12	0	-10.00
12	-10	-14.00
12	-20	-12.00



## 8.9 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

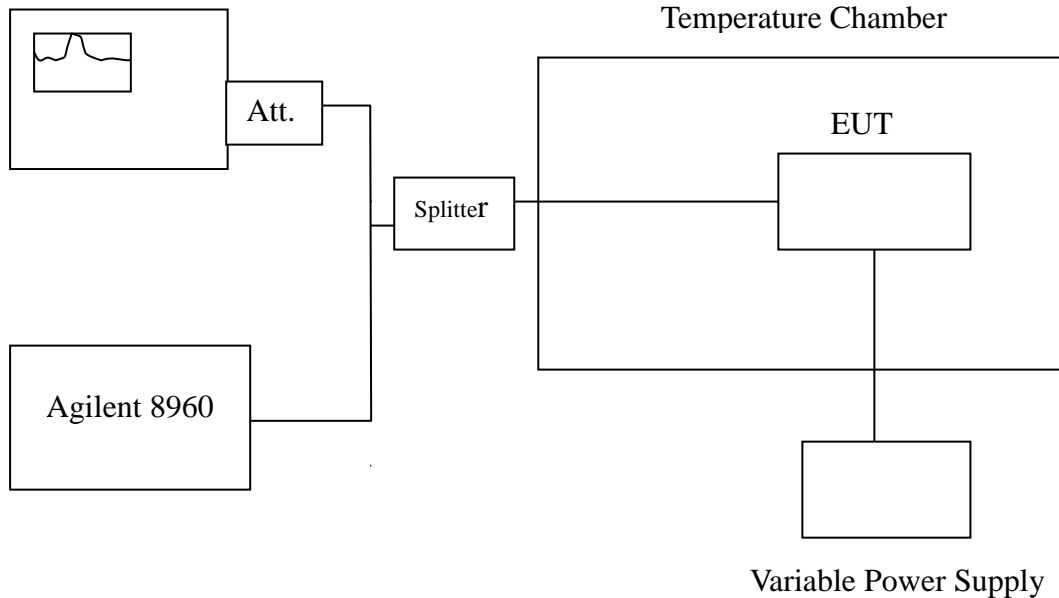
### LIMIT

According to FCC §2.1055, FCC§27.54.

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### Test Configuration

Spectrum analyzer



**Remark:** Measurement setup for testing on Antenna connector.

### TEST PROCEDURE

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.



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## **TEST RESULTS**

*No non-compliance noted.*

Reference Frequency: WCDMA 12.2k RMC Band IV Low Channel 1712.4 MHz		
Limit: 1712.4-1752.6 MHz		
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Error(Hz)
10.2	20	6.00
12		6.00
13.8		5.00

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz		
Limit: 1712.4-1752.6 MHz		
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Error(Hz)
10.2	20	4.00
12		5.00
13.8		4.00

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz		
Limit: 1712.4-1752.6 MHz		
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Error(Hz)
10.2	20	-12.00
12		-13.00
13.8		-13.00

-- End of Test Report --